

Continued Development of a Soft Gamma-Ray Concentrator

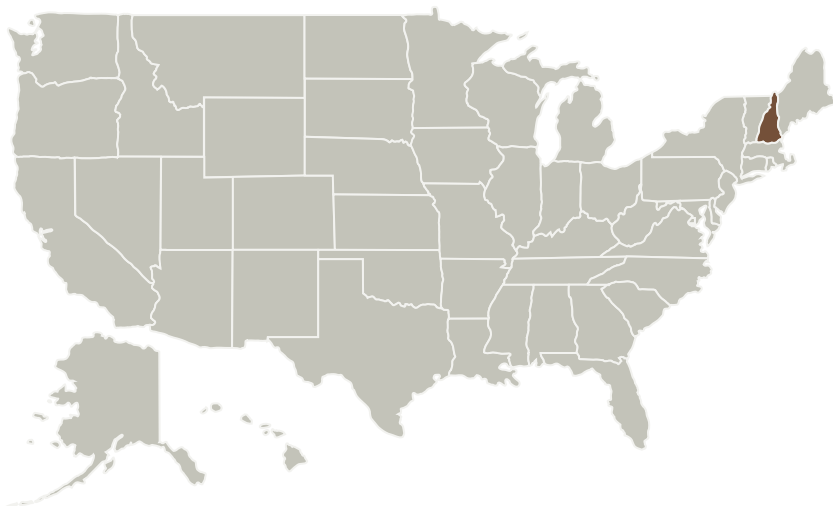
Completed Technology Project (2017 - 2018)



Project Introduction

We propose to continue our development of a concept for a soft gamma-ray ($E > 100$ keV) concentrator using thin-film multilayer structures. Alternating layers of low- and high-density materials will channel soft gamma-ray photons via total external reflection. A suitable arrangement of bent structures will then concentrate the incident radiation to a point. Gamma-ray optics made in this way offer the potential for soft gamma-ray telescopes with focal lengths of less than 10 m, removing the need for formation flying spacecraft and opening the field up to balloon-borne instruments. Under previous APRA funding we have been investigating methods for efficiently producing such multilayer structures and modeling their performance. We now propose to pursue magnetron sputtering (MS) techniques to quickly produce structures with the required smoothness and thickness, to measure their channeling efficiency and compare with calculations, and to design a "lens" with optimized bandpass and throughput and predict its scientific performance. If successful, this work will confirm that this innovative optics concept is suitable for a balloon-born soft gamma-ray telescope with unprecedented sensitivity.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
University of New Hampshire-Main Campus	Lead Organization	Academia	Durham, New Hampshire



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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Lead Organization:

University of New Hampshire-Main Campus

Responsible Program:

Astrophysics Research and Analysis

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Primary U.S. Work Locations

New Hampshire

Project Management

Program Director:

Michael A Garcia

Program Manager:

Dominic J Benford

Principal Investigator:

Peter F Bloser

Co-Investigators:

James E Krzanowski

Lisa Scigliano

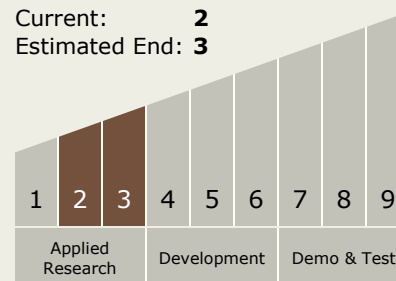
Mark Mcconnell

Technology Maturity (TRL)

Start: 2

Current: 2

Estimated End: 3



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.3 Optical Components

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Target Destination

Outside the Solar System